Walking pattern in OECD / ITF* countries

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Abstract

Indeed, most everyone engages in some amount of walking every day. Walking serves numerous functions in our daily lives including meeting various social, recreational, health and transportation needs. How much people walk, how often and for what purpose varies between and within countries. Pedestrian travel habits are influenced by cultural and environmental factors, such as social values and attitudes, weather conditions, infrastructure, geographic location and proximity, as well as individual differences, such as lifestyle, age, income, health and physical ability. The challenge is to gather information about these factors. This paper focuses on how we measure pedestrian mobility and differences between countries and various groups in the population when it comes to walking.

Many OECD countries collect mobility data on a national scale. However, as the emphasis is usually on motorised travel, not all include measures of pedestrian mobility. For example National travel surveys do not always capture the full extent of pedestrian shares in multi-modal chains. A substantial amount of pedestrian activity and consequently the importance of walking are underestimated under the current data collection practices.

The majority of pedestrian trips are quite short. Distance traveled, however, should not be used as a measure of the importance of walking relative to other modes of transport because it results in a gross underestimation. When the time spent traveling and the number of trips is considered, one can see that walking has a much more prominent place in the modal mix. Although walking only represents 3% of the total daily distance traveled per person in for example Finland, it accounts for more than 20% of the total daily time spent traveling per person as well as the total daily number of trips per person.

Statistically, the amount of walking is a reflection of car use. In general, as the share of walking increases, car use declines. Walking only accounts for about 9% of trips made in the United States, while car use accounts for 87% of trips taken. In contrast, walking trips are more comparable to the amount of car trips in Switzerland (23% vs. 36%).

*OECD - ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT
ITF - INTERNATIONAL TRANSPORT FORUM

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Introduction

Walking has been the dominant mode of transport around the world for many centuries. Since the nineteenth century, however, the development of railway and highway systems has led to dramatic changes in travel behaviour with a substantial shift towards motorised transport modes. In addition, bicycles also became available as a possible substitute for walking (Reitveld, 2001). Despite these developments, walking remains an attractive method of transport and almost everyone engages in some amount of walking every day. How much people walk, how often and for what purpose varies between and within countries. Pedestrian travel habits are influenced by cultural and environmental factors, such as social values and attitudes, weather conditions, infrastructure, geographic location and proximity, as well as individual differences, such as lifestyle, age, income, health, physical ability, and perceptions of risk. The challenge is to gather information about these factors. This paper focuses on how we measure pedestrian mobility and differences between countries and various groups in the population when it comes to walking.

Measuring travel behaviour

OECD countries collect information on the travel behaviour of their citizens through mobility surveys or census questionnaires. This information provides an overall view of mobility and is used to formulate policies and develop infrastructure and traffic safety measures, as well as, providing direction for future transportation research and decision-making. It also helps to assess the efficiency and safety of transportation systems. In order to ensure that the needs of pedestrians are taken into account, it is essential that pedestrian mobility is well researched and understood. The question is whether this is possible using current travel behaviour data.

Many OECD countries collect mobility data on a national scale. However, as the emphasis is usually on motorised travel, not all include measures of pedestrian mobility. A review of the pedestrian mobility data that is collected among OECD countries shows that the frequency, method, and scope of data collection currently being carried out vary between countries.

For those countries that collect pedestrian mobility data on a national scale, data is most typically collected at 5-year intervals. Some countries however, collect data either much more or less frequently. While, Switzerland conducts its National Travel Survey every five years, in the Netherlands mobility data is collected continuously through an ongoing survey of travel behaviour, and Germany carries out its National Travel Survey on an ad hoc basis**.**

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Overall, national travel surveys make use of well-designed sampling techniques. Typically, households or individuals are randomly selected for survey to ensure that the data collected is representative of all segments of the (non-institutionalized) population and geographic regions intended for study.

Not all members of selected households necessarily contributed to data. Often the movements of young children are excluded from the research. Persons within the specified age range are requested to record or report on all journeys made on a particular day or during the travel period under study. When samples include young children, adults in the household are responsible for noting their movements.

Common methods of data collection include questionnaires or journals distributed to households by mail or in person, telephone interviews and face-to-face in-home interviews. Online data collection methods are also employed and will no doubt be used more in the future. Each of these methods may be used on their own or in conjunction with others. For example: The National Travel Survey of Finland (2004-2005) was conducted by telephone interviews. The New Zealand Household Travel Survey (2003-2006) made use of interviewer visits. First, interviewers distributed journals to respondents to record their travel. Later interviewers returned to discuss the results and probe for additional details. And the National Mobility Survey of Germany (2002) was administered through a methodological mix of postal, telephone and online survey methods.

In general, the data collection targets demographic information such as age, sex, income, and mobility disabilities, as well as questions about vehicle ownership, possession of driving licences, and daily travel habits. For each trip, respondents are typically asked to record start and end point, distance travelled, duration/travel time, mode(s) of transport used, and purpose of the trip, such as work, education, shopping/personal business, social visits, leisure/recreation, and accompanying someone else.

Measuring pedestrian mobility

As the emphasis in travel behaviour surveys is usually on motorised travel, not all include measures of pedestrian mobility. Even if pedestrian mobility is recorded, pedestrian activities are not commonly defined, and there is a problem of under-representation.

At present, there is *no standard in terms of the set of pedestrian activities* that comprise pedestrian mobility statistics. Thus, some surveys have a much wider definition of what is classified as pedestrian behaviour than others. To illustrate: The New Zealand Household Travel Survey (2003-2006) included walkers, joggers, users of mobility scooters, and children on tricycles. The Finnish National Travel Survey (2004-2005) included walking, running, and users of kick sleds, kick bikes, walkers, wheelchairs, skis, and rollerblades. The United States National Travel Survey (2001) combined walking and jogging in the walk category. The National Travel Surveys of Belgium (1999), Sweden (2005) Norway (2005) and Switzerland (2005) simply measured travel on foot.

Where pedestrian activity takes place is also a factor that determines whether information is recorded and thus another source of variation in pedestrian mobility statistics. For example: The New Zealand Household Travel Survey (2003-2006) did not collect data for walking that was done off-road, such as walking around private land or tramping (long distance walking or hiking with at least one overnight stay). The National Norwegian Travel Survey (2005) registers only trips completed in traffic environments. And the National Travel Survey of Sweden (2005) recorded movements outside of the regular traffic environment including nature walks.

In most travel surveys a pedestrian trip is recorded as a trip where the whole trip is done by foot. As will be shown later, the majority of these pedestrian trips are quite short. The design of many travel surveys leads *to a neglect of short trips* like walking with the dog, bringing a letter to the mail box or calling by at a neighbour's place. These short trips are often overlooked. In terms of total number of kilometres travelled, this neglect does not have a large impact; however, in terms of the number of trips and travel time, this may lead to a substantial underestimation (Reitveld, 2001).

In National Travel Surveys a walking trip is defined as a trip where the entire trip is on foot. However, *walking is a key element in almost all multi-modal trip chains*. Assessing pedestrian mobility at the country level is particularly challenging because National Travel Surveys do not always capture the full extent to which walking is represented in multi-modal chains. The design of many national travel surveys is such that travel involving multiple modes is recorded in terms of the 'main' or 'primary' transport mode only. For example, persons using more than one mode of transportation over the course of a journey may be asked to only report on the mode of travel used for the longest distance covered on the journey. As a result, it is often the walking portions of trips made in conjunction with other modes that are not recorded.

Comparing national pedestrian mobility statistics can be challenging due to the variation in definitions of pedestrian activity. There may be differences in the age range of the samples and the design of the surveys, in addition to the scope of pedestrian activity that is captured, all of which have an impact on the final figures. Furthermore, data collection occurs infrequently in some countries, creating an *obstacle for comparison and generalisation at the international level*, with pedestrian mobility patterns having changed significantly since the data was last collected.

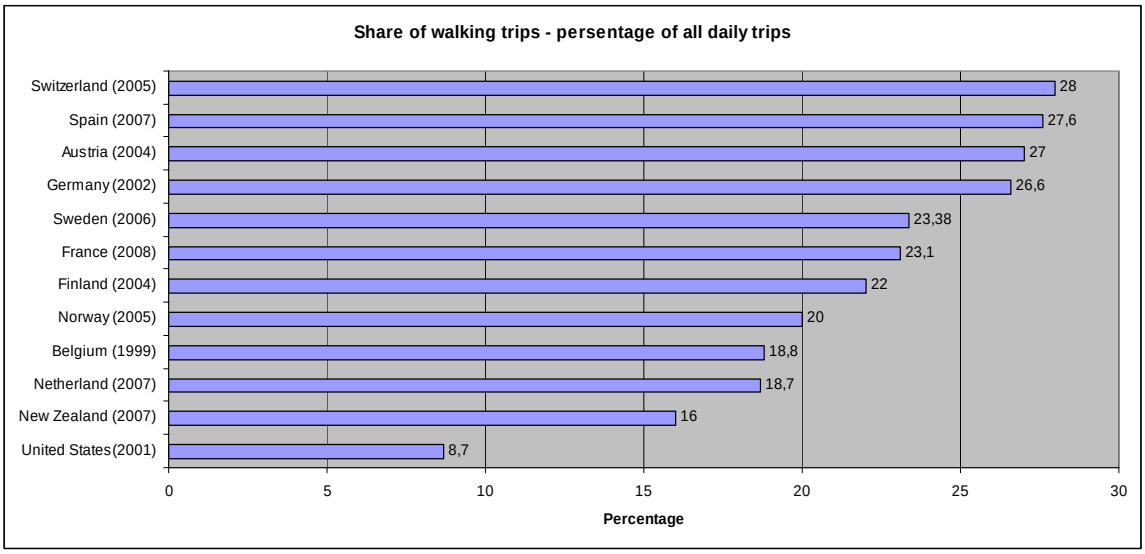
Despite methodological differences and difficulties, it is possible to provide *an idea* of pedestrian behaviour and the range of walking in different countries and different segments of the population. It is important to note, however, that the figures and statistics are only approximate estimates.

Pedestrian mobility patterns

The amount of walking may be measured in different ways. Although modal split is usually described as the share of all trips the amount of walking may also be described in distance, duration and frequency (at the individual level).

The share of walking

The share of walking trips (entire trips on foot) seems to vary among different countries. According to the US National Household Travel Survey (2001), 8.6% of all trips were walking trips. In contrast, the Swiss 2005 Micro census on Travel Behaviour identified that 28% of all trips were completed by foot. Cultural differences in attitudes towards walking compared to other transportation modes may provide an explanation for the discrepancy between results. Figure 1 illustrates the share of walking in different OECD countries.



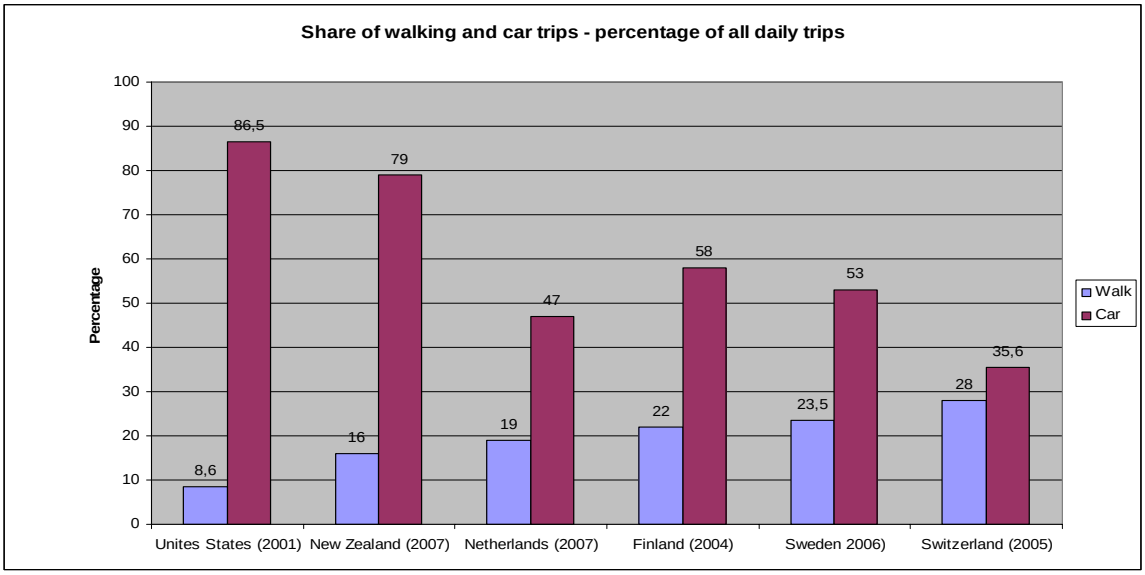
Source: OECD Working Group on Pedestrian Safety, Urban Space and Health – Country reports and figures from National Travel Surveys

Figure 1: Share of walking trips in percentages of all trips in various OECD countries.

All reported shares are shares of entire trips on foot as a percentage of all trips. However, *trips taken by other transportation modes also have an element of walking*. For example, a simple trip by public transport has at least three elements or stages: 1) from home to bus stop on foot, 2) the bus ride, and 3) from bus stop to destination by foot. If a stage level perspective were taken on all multi-modal trip chains, the picture would therefore be different. For example, in Switzerland 28% of all trips are pedestrian trips (entire trips on foot), but 45% of all stages are pedestrian stages. Stage data from other countries are not available, but the Switzerland example illustrates that *the real share of walking is much higher than reported in the statistics*.

The differences in share of walking between the different countries may be explained by different transportation cultures. Some countries, like the United States, are known to have a widespread car use culture. The general land use, with long distances, urban sprawl and infrastructure adapted for motorised individual transport, is part of the explanation. In addition, people tend to have a special relationship to their car, and car use is related to individual freedom more than other places. The relatively low share of walking in New Zealand may also be understood in the light of a dominant car use culture. As in the United States, New Zealand has had its dominant urban development after the car was invented and in a period when population density and shortage of land were not an issue. The car has been the basis for land use development, and in New Zealand young people are allowed to get a driving licence from the age of 15 years. In Europe, 17 or 18 years is the most common age limit for getting a driving licence.

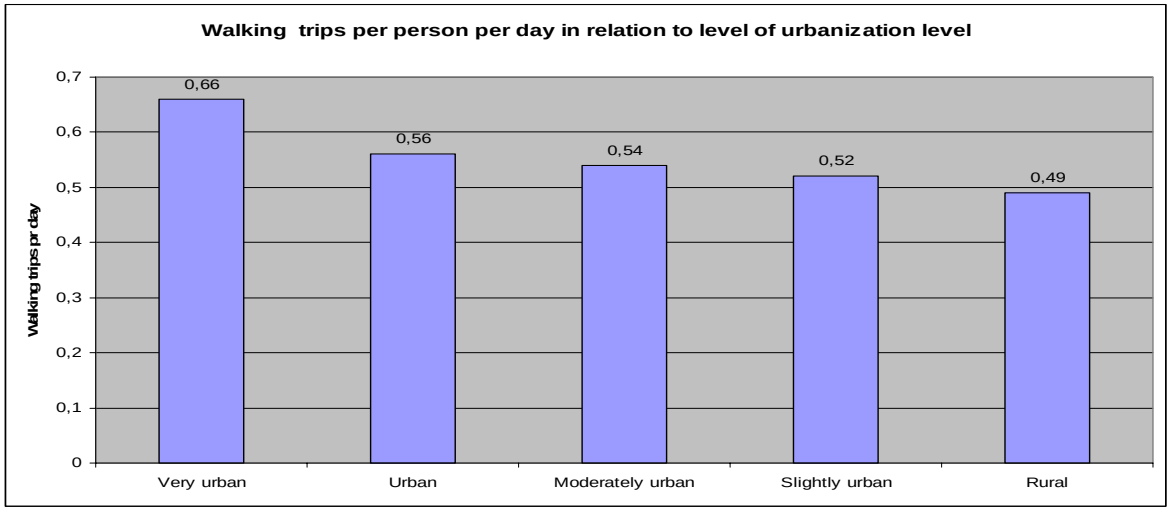
The high share of walking in Switzerland, Spain, Austria and Germany may be explained by their high level of urbanisation and their effort to reduce car use in urban areas. Statistically, the amount of *walking is a reflection of car use*. In general, as the share of walking increases, car use declines. Figure 2 shows that walking only accounts for 8.7% of trips made in the United States, while car use accounts for 86.5% of total trips taken. In contrast, walking trips are more comparable to the amount of car trips in Switzerland (23% vs. 36%). The relatively low share of car use (47%) and walking (19%) in the Netherlands is due to a much higher bicycle share (27%) relative to the other countries.



Source: OECD Working Group on Pedestrian Safety, Urban Space and Health – Country reports and figures from National Travel Surveys

Figure 2: Modal share of walking and car use as a percentage of all trip.

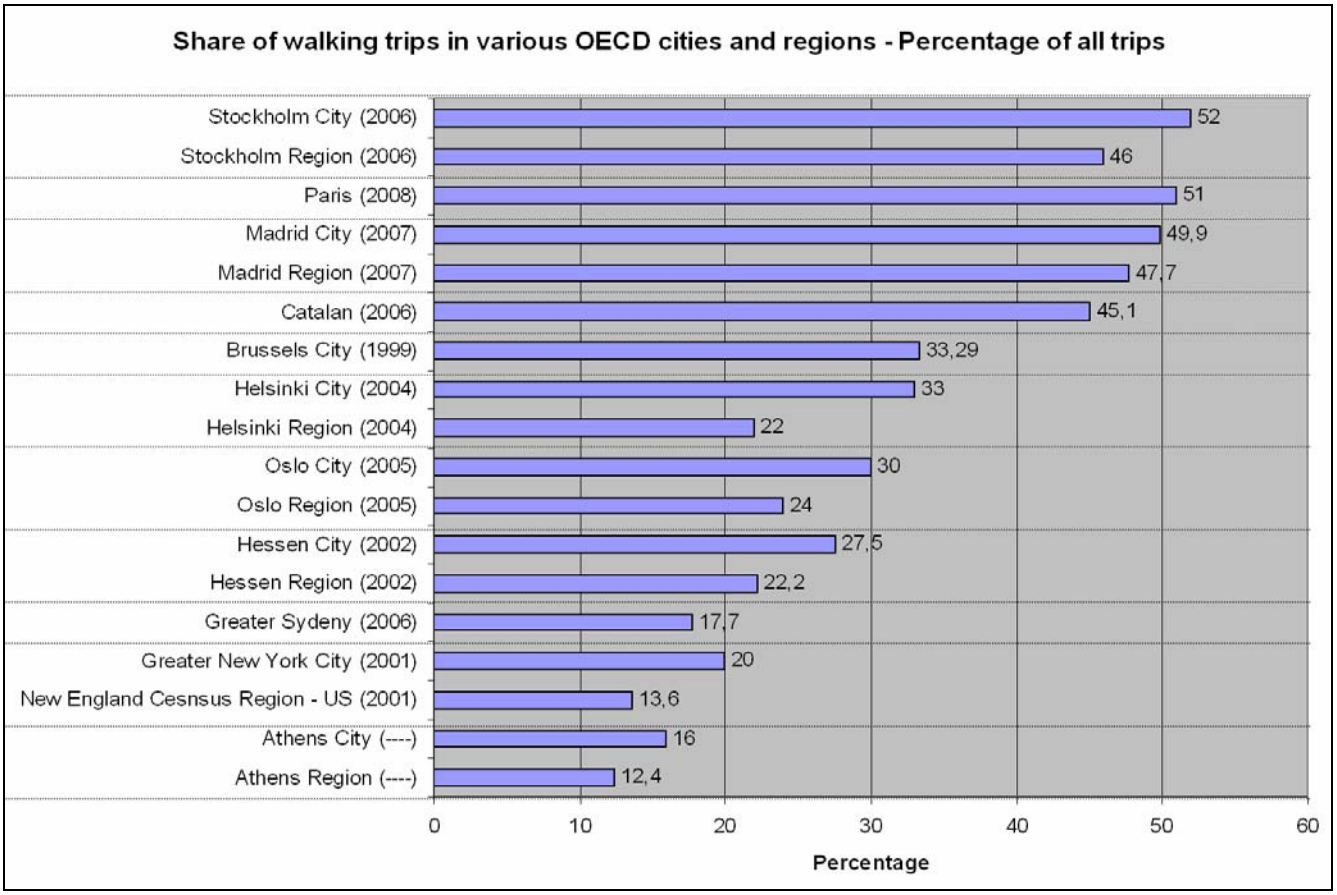
Walking tends to be above national averages in urban areas and lower in rural areas. Figure 3 below demonstrates that the number of walking trips made by Dutch citizens increases with the *level of urbanisation*. Individuals living in very urban areas were found to have the most daily walking trips per person (0.66 trips), whereas individuals living in rural areas had the fewest (0.49 trips).



Source: The Dutch National Travel Survey 2007

Figure 3 Walking trips per person per day in relation to level of urbanisation

This also corresponds closely to various other OECD cities and regions, as illustrated in Figure 4. In dense city areas, the share of walking is higher compared to other less dense areas.



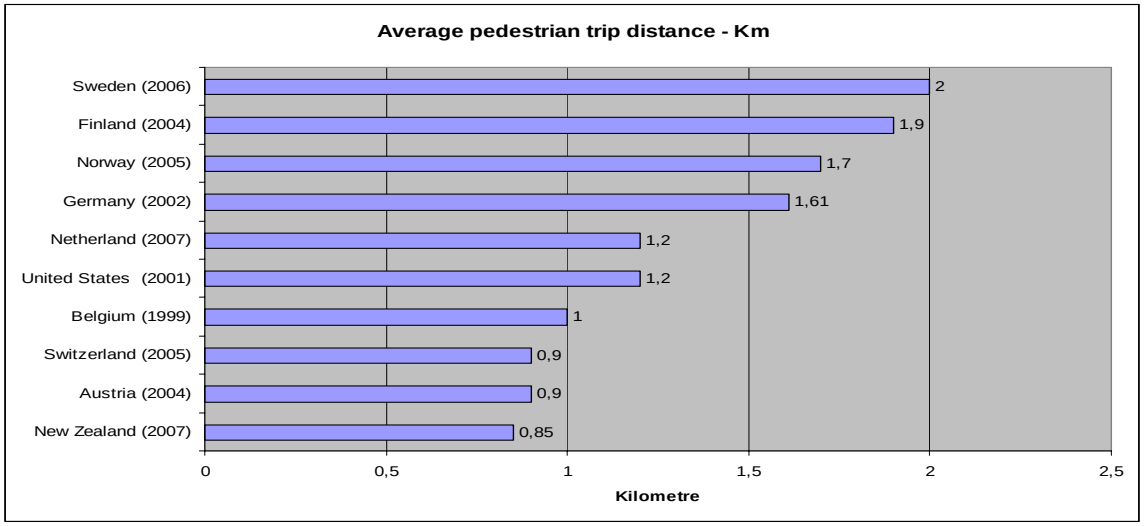
Source: OECD Working Group on Pedestrian Safety, Urban Space and Health – Country reports and figures from National Travel Surveys

Figure 4: Share of walking trips in percentages of all trips in various cities and regions

The high percentage of walking both in Stockholm City and in the Stockholm region may to some extent be explained by methodological causes, as nature walking is included. Still, a difference between Stockholm City and the region is seen. The high percentage of walking in Paris and Madrid might be an illustration of the fact that these cities have a higher level of urbanisation compared to the other cities we have available data from. The share of walking in New York City should be high due to the high degree of urbanisation. However, the data we have available do not differ between New York City and Greater New York City.

Distance, duration and speed

In industrial countries *the majority of pedestrian trips are quite short*. In Switzerland, for example, the Micro Census on Travel Behaviour (2005) determined that 60% of walking trips in Switzerland did not exceed 1 km, and only 10% of them exceeded 2 km. The average journey on foot in Sweden, as determined by the National Travel Survey (RES 2005-2006) is somewhat longer, at 2 km; however, when compared to the average journey by car (drivers 30 km, or passengers 41 km), bus (26 km), or bicycle (4 km), walking distances are still relatively short. Figure 5 illustrates the average walking distance per trip (entire trips on foot) in different OECD countries.



Source: OECD Working Group on Pedestrian Safety, Urban Space and Health – Country reports and figures from National Travel Surveys

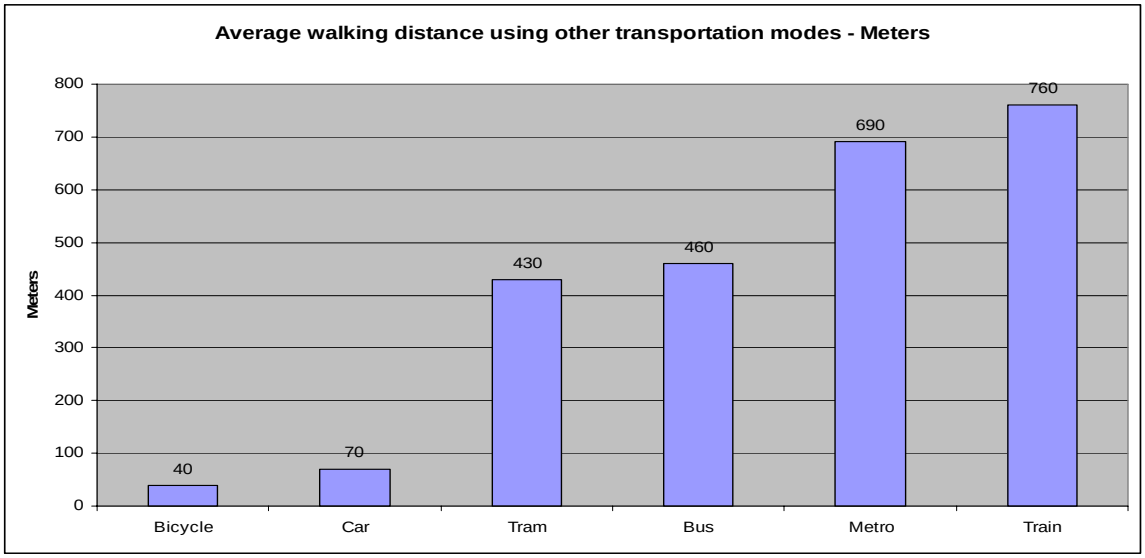
Figure 5: Average pedestrian trip distance in kilometres.

Some of these differences may have methodological explanations. For instance, the average long distance of waking trips in Sweden and Finland may be explained by how walking trips are reported. As mentioned, the National Travel Survey of Sweden (2005) recorded movements outside of the regular traffic environment. This means that they also include nature walks, and these leisure walks tend to be longer than the everyday walking trip in traffic.

When it comes to the high Finish score, this may be explained by how they define walking. The Finnish National Travel Survey (2004-2005) included walking, running, and users of kick sleds, kick bikes, walkers, wheelchairs, skis, and rollerblades. These types of movements and equipment affect the length of a trip. What is puzzling is that the New Zealand Household Travel Survey (2003-2006) also included walkers, joggers, users of mobility scooters, and children on tricycles.

In sum, Germans seem to walk more than other people. Germany has one of the highest shares of walking trips and the average distance of a pedestrian trip is relatively long. In contrast, New Zealand has a relatively low share of walking and in addition the average walking trip is short. Austria and Switzerland seem to have another distinct walking culture. They have a high share of walking, but every walking trip is quite short. However, the most interesting finding might be that while people in United States tend to walk less than others, those who walk tend to walk as far as pedestrians elsewhere.

The distances shown in Figure 5 are distances of entire trips on foot. However, it is again important to note that *walking is a key element in all trips*. In the 2005 Norwegian National Travel Survey respondents were asked specifically about walking distances related to *all* trips. Results found that in one day Norwegian people, on average, walked 280 meters while also using other transportation modes. Furthermore, the results indicated that of all trips, on average about 110 meters are completed on foot. Distances for walking were found to be longest in trips that involved public transport, and people are willing to walk longer to get to higher efficient public transport services than to less efficient services. Figure 6 illustrates the average walking distance completed while using other transportation modes.

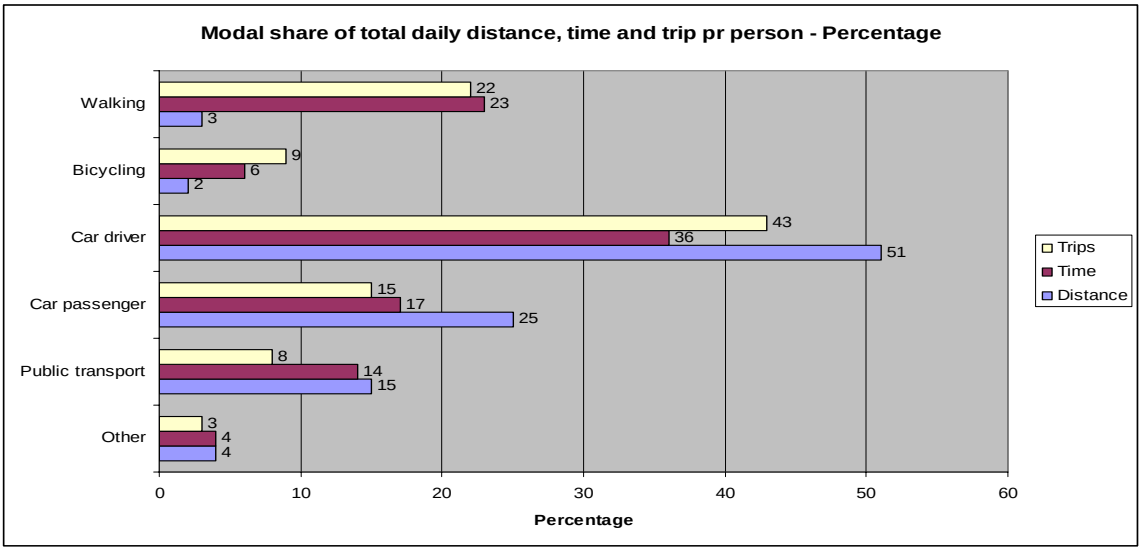


Source: Norwegian National Travel Survey 2005 (Vagane, 2006)

Figure 6: The average walking distance completed while using other transportation modes.

Distance is not a measure of importance. Expressing pedestrian mobility in terms of distance travelled should not be used as a measure of the importance of walking relative to other modes of transport, because it represents a gross underestimation of overall walking undertaken. When important factors such as time spent travelling and the number of trips is considered, one can see that walking has a much more prominent place in the modal mix than measures of distance would suggest.

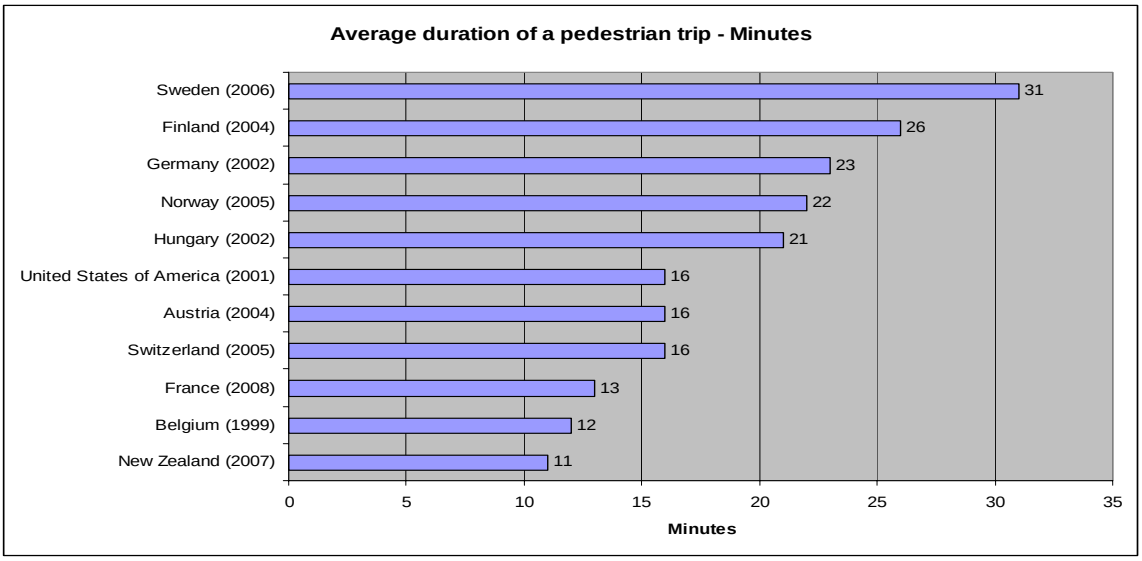
Figure 7 displays results from the Finnish National Travel Survey (2004-2005) that illustrate the prominence of walking. Although walking only represents 3% of the total daily distance travelled per person in Finland, it accounts for more than 20% of the total daily time spent travelling per person, as well as the total daily number of trips per person. Consequently, it is critical to formulate policies and develop infrastructure and safety measures based on a full understanding of the prevalence of pedestrian activity to ensure that the needs of pedestrians are given the consideration and weight that is due.



Source: The Finnish National Travel Survey (2004-2005)

Figure 7: Modal shares of total daily distance, time and trips per person.

The average trip duration for pedestrian trips (entire trip by foot) varies among the OECD countries. The countries that report the average longest walking trips also report the longest duration of an average trip, as illustrated in Figure 8.



Source: OECD Working Group on Pedestrian Safety, Urban Space and Health – Country reports and figures from National Travel Surveys

Figure 8: Average duration of a pedestrian trip (in minutes) in different countries.

Even though the countries that report the average longest walking trips also report the longest duration of an average trip, there are national differences in walking speed. Comparing the distances with these durations of pedestrian trips shows that people in the OECD-countries walk at a *speed* of between 56 and 77 meters per minute. If these figuresare reliable, it is interesting to note that the people walking in Austria and Switzerland, where they have the highest share of walking and the shortest trips, have the lowest average walking speed of all (56 m/min). One explanation might be that more of the walking trips in Austria and Switzerland are done in urban areas, where the possibility of walking fast is less. Another explanation is that since more people are walking in Austria and Switzerland, walking is more common in all groups of the population, also among older people who walk relatively slowly. New Zealand and Norway have the highest average speed (77m/min). The explanation for the high speed of walking in New Zealand might be because they also include joggers, users of mobility scooters, and children on tricycles as pedestrians. The high speed of Norwegian pedestrians is more difficult to explain, even though I am Norwegian.

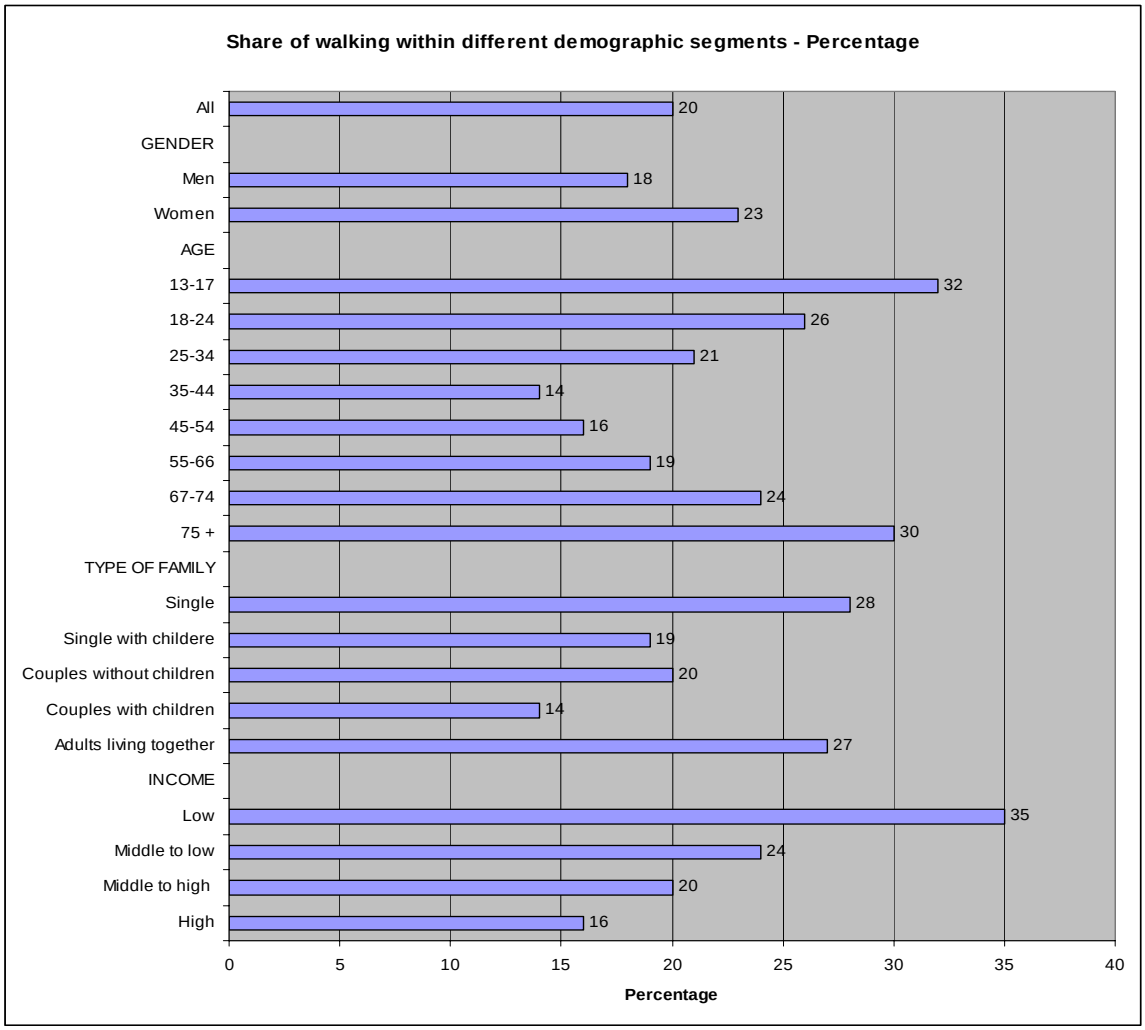
One Danish article (Herrstedt and Lund 2010) shows that different countries use different standard values for pedestrian speed in planning. Several countries (Norway, Finland, and Germany) use 72 m/min as the normal value. Danes use 60 m/min. The United States has changed from 72 to 54 m/min in step with the weight increase in the population. What is most important is that traffic planners should be aware that some groups are slower than average.

Demographic differences

The objectives of walking tend to fluctuate when demographic variables, such as age and gender, are factored in. According to the New Zealand Household Travel Survey (2003-2007), getting to a place of education is the dominant objective for those between the ages of five and twenty-four. In contrast,

the priority for people aged twenty-five to thirty-four is getting to work, whereas for those aged thirty-five to seventy-four, it is recreation. Furthermore, for those aged seventy-five years and above, the dominant purpose for walking is shopping.

In general, women make more walking trips than men. For example, in Sweden women make 27% of their journeys on foot, while men make about 20% of their journeys on foot (RES 2005-2006). It has also been found that women on the whole travel further on foot and spend more time walking (Finland, The Netherlands, and New Zealand). Youth and seniors tend to make a higher proportion of their trips on foot, as well as those with lower income levels. Data from the Norwegian National Travel Survey 2005 illustrated these differences, as displayed in Figure 9.



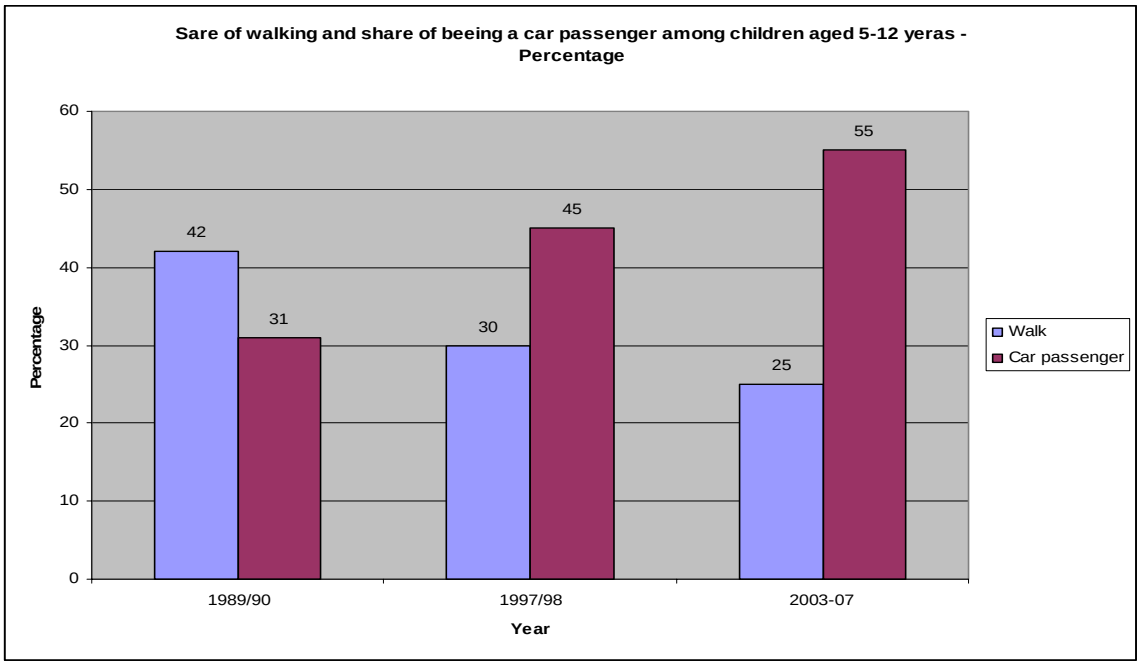
Source: Norwegian National Travel Survey 2005, as cited in, Denstadl et al (2006)

Figure 9 : Differences in share of walking trips among men and women, age groups, type of family and income (as a percentage).

Young people walk more than others. A travel behaviour survey among children in Norway between 6 and 12 years shows that more than half of the children walk or cycle to school (Fyhri & Hjorthol, 2006). In contrast, the majority of children are driven by car to organised leisure activities.

Data from New Zealand show that the share of walking trips among children has declined and continues to decline. The share of walking trips among children was higher than the share of being a

car passenger in 1989/90. Over time, this relationship has changed dramatically, as illustrated in Figure 10.



Source: New Zealand Household Travel Survey 2003-2007

Figure 10: Share of walking trips and share of trips as car passengers among New Zealand children aged 5-12 years

In Norway, parents who took their children to school by car were asked their main reason for doing so (Fyhri & Hjorthol, 2006). The most frequent response was that the school was located along the route to work (60%), while traffic safety was also mentioned (approximately 20%). In addition, there is a clear relationship between distance to school and mode of travel. When distances to school are above 3 km, cars are the preferred mode of travel. There is a 75% rate of walking for distances below 0.5 km however, this value decreases to 2% for distances over 3 km. This is not a promising prospect for walking patterns in the future population.

Conclusions and recommendations

Policy makers rely on mobility statistics, including data on personal travel behaviour, to formulate strategic transportation policies and to improve the safety and efficiency of transportation systems. Data on pedestrian mobility trends are needed to examine the reliability, efficiency, capacity, safety, and flexibility of transportation systems to meet current needs of pedestrians, while also accommodating future needs. At present, pedestrian mobility is under-researched and under-represented in transportation statistics.

Development of standardised methodology and definitions for measuring pedestrian mobility in order to increase comparability of statistics at the international level is vital. The quality of data on pedestrian mobility needs to be improved, and a focus on under-representation is essential. Under-representation of walking trips (where the whole trip is done by foot) was rectified in the 2001 US National Household Travel Survey through multiple prompting regarding walking and bike trips. This resulted in a significant increase in the number of walking and bike trips recorded. This finding

supports the importance of addressing the under-representation of pedestrian trips with current data reporting methodology.

With respect to multi-modal travel, it is important to concentrate on capturing the distances covered on foot. In the 2005 Norwegian National Travel Survey this was done by asking specifically about walking distances related to all trips. This made it possible to report how many meters, on average, people walked using other transportation modes (as was illustrated in Figure 6). Recording distances and duration for all stages of a trip is also important. Exact localisation of start and end points for all trips by geographic coordinates may also help to enhance the recording of walking distances.

Use of GPS (Global Positioning System) in travel behaviour studies has been tried out in various countries like the United Kingdom, Germany, Netherlands, Canada, Australia and the US. Specific studies of walking may benefit from using this kind of technology.

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